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ABSTRACT

This report describes a workshop for 24 midlevel managers that provided information on change areas critical to program planning in the Wisconsin Vocational, Technical, and Adult Education (VTAE) system. These change areas include technology, labor market, demographic, and educational trends. In addition, techniques for identifying and forecasting changes in these areas were discussed. Participants were also provided time to discuss the implications of these changes for their districts and develop a plan for using this information to change programs and services. Included with the workshop report are an agenda, activities and a timeline for further planning, contact letters, a participant list, a business/industry survey form, workshop handouts, a paper on the Delphi technique by Orville Nelson, and discussion session results. (KC)

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Final Report

VTAE Trends and Forecasting Workshop
November 13-15, 1989

by

Orville Nelson
and
Howard D. Lee

Center for Vocational, Technical and
Adult Education

University of Wisconsin-Stout
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TRENDS AND FORECASTING
WORKSHOP
June 1990

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Final Report
VTAE Trends and Forecasting

Introduction:

A Trends and Forecasting Workshop for VTAE Managers was conducted November 13-15, 1989 at the UW-Stout Memorial Student Union. The workshop was developed in response to a need identified by VTAE administrators, managers and supervisors through a system-wide needs assessment survey and recommendations from the participants in the first Trends and Forecasting Workshop.

Each VTAE district was invited to send two middle-management staff members to the workshop. A total of twenty-four mid-managers from ten districts and members of the WBVTAE staff participated in the two-and one-half day workshop. The agenda was designed to provide information on change areas critical to program planning in the VTAE system. These change areas included technology, labor market, demographic and education trends. In addition, techniques for identifying and forecasting changes in these areas were discussed. Participants were also provided with time to discuss the implications of these changes for their districts and develop a plan for using this information to change programs and services.

At the end of the workshop, participants were asked to evaluate their experiences. Summary results of the evaluation indicated that the workshop was received very well.

Purpose:

The purpose of this two-and one-half day Trends and Forecasting Workshop was to provide training to middle management personnel from the VTAE districts on:

- Techniques for needs assessment
- Guidelines for future trends relating to recruitment and delivery implications of programs
- Application-dealing with trends data and how to make practical us of the information
- Practice - have the opportunity to practice strategies for implementation with members from individual districts.

Objectives:

Based on a review of the evaluation results and input from selected VTAE administrators and the State Board of VTAE personnel, the following objectives for the workshop were developed.

1. Become aware of needs assessment techniques, by gathering data (internal and external).

2. Identify guidelines for future trends and forecasting, especially those relating to recruitment and alternative delivery implications.

3. Recall sources of data relating to future trends and forecasting, from local, district, state and national data banks.

4. Match data type to typical uses by district, program and teachers.

5. Utilize gathered data by applying trends and forecasting strategies to own district setting.

6. Develop a plan for sharing guidelines and strategies with staff in own district.

Activities and Timeline:

The project included the following activities:

1. Review first Trends and Forecasting Workshop evaluation results (August 1989)

2. Develop workshop outline and share with selected VTAE and State Board members (August 1989)

3. Contact speakers and obtain commitment (August 1989)

4. Develop internal and external scanning worksheets for participants (August 1989)

5. Develop tentative agenda and letter to districts (September 1989).

6. Develop handouts and workbook (September-October 1989).

7. Conduct 2 1/2 day workshop (November 1989).

8. Evaluate workshop and submit final report (June 1990).

Approach:

This workshop utilized the experience and knowledge of consultants in the area of new strategies on future trends and forecasting, and VTAE State Board staff and district personnel to provide examples of the how to gather and use the data available. More specifically, participants, were asked to do an internal and external needs assessment scanning activity. A copy of the business/industry survey used is included in the appendix. Participants brought this information to the workshop, applied trends and forecasting strategies and made applications to their own district setting. The evening speaker on the second day of the workshop addressed the implications of "High Tech Trends".

Each district was asked to send a team of two (supervisory/mid- management staff) members to the workshop that would utilize the information and have an impact on the district. Participants who attended the previous Trends and Forecasting workshop would be permitted to attend only if roomwas available. Participants selected were required to share the guidelines and strategies learned with their own district staff. See the appendix for the contact letter.

Participants could take one graduate credit for their participation but had to pay the segregated fee.

Workshop Agenda

Inputs from several sources were used to develop the workshop agenda. WBVTAE staff, members of the Stout Advisory Committee, and participants in the first Trends and Forecasting Workshop made suggestions. This information was used by the project staff to develop a draft agenda. This agenda was reviewed with staff members at the Wisconsin Board of Vocational, Technical & Adult Education (WBVTAE). The final agenda follows on the next page.

Whenever possible, participants were involved with using the technique discussed. For example, during the workshop the participants completed a miniature Delphi Study. Participants identified trends, rated their likelihood of occurrence; and interpreted the results. Modern media were used to enhance the experience. Two district directors, Dr. Beverly Simone and Dr. Stanley Spanbauer, had ten minute video tapes prepared. These tapes presented their comments on planning for the future. After a tape had been played, the director participated in a telephone conference call question and answer session. This combination of media was very effective. (See items 9 and 10 in Table 1.)

Materials used in the workshop are included in the appendix.

11/9/89

AGENDA

Trends and Forecasting Workshop
for
VTAE Managers

Monday, November 13, 1989
Crystal Ballroom B
UW-Stout Memorial Student Center

8:00 - 8:30	Registration ($12.50 registration fee)
8:30 - 8:45	Welcome - Orville Nelson
8:45 - 10:15	Educational Trends - Robert Ewy, Senior Program Associate, Mid-Continent Regional Educational Laboratory, Aurora, Colorado
10:15 - 10:30	Break
10:30 - 11:30	Discussion Groups - Discuss trends
11:30 - 12:00	Group reports
12:00 - 1:00	Lunch - Ballroom C
1:00 - 1:30	Registration for course credits - Howard Lee
1:30 - 2:30	Changes in Vocational and Technical Education Neal Prichard, Professor, Industrial and Marketing Education
2:30 - 2:45	Break
2:45 - 3:45	Changes in Manufacturing Companies Mike Closser, Phillips Plastics
3:45 - 4:00	Delphi Technique - Orville Nelson
4:00 - 5:00	Develop Delphi Trend statements - small groups
5:15 - 6:00	Casual Conversation - Ballroom A
6:00 - 7:15	Dinner - Heritage Room
7:15 - 8:15	High Tech Trends - M. James Bensen, President Dunwoody Institute - Ballroom A

11/9/89

AGENDA

Trends and Forecasting Workshop
for
VTAE Managers

Tuesday, November 14, 1989
Crystal Ballroom B

8:00 - 8:15	Overview
8:15 - 8:30	Complete Round 2 of Delphi Survey-Orville Nelson
8:30 - 9:45	Major Labor Market Trends - August Cibarich, Labor Market Analyst, DILHR Forecasting Jobs in the Year 2000 - Jerry Snow Labor Market Analyst - DILHR
9:45 - 10:00	Break
10:00 - 11:00	Small group discussions
11:00 - 11:50	Small group reports
12:00 - 1:00	Lunch - Ballroom C
1:00 - 2:15	How WBVTAE Uses Data in Policy Making Janet Washbon, Assistant Bureau Director Policies Studies Bureau, WBVTAE
2:15 - 2:45	Small group discussions
2:45 - 3:00	Break
3:00 - 3:45	Group complete discussion and report
3:45 - 4:30	Delphi Round 2 results - Orville Nelson Complete Round 3
4:30 - 5:00	Environmental Scanning - Orville Nelson

11/9/89

AGENDA

Trends and Forecasting Workshop
for
VTAE Managers

Wednesday, November 15, 1989
Crystal Ballroom A

8:00 - 8:15	Overview
8:15 - 9:15	Using Forecasts and Trends information in VTAE District Planning • Dr. Stanley Spanbauer, District Director Fox Valley Technical College • Dr. Beverly Simone, District Director Madison Area Technical College
9:15 - 10:00	Small Group Discussion
10:00 - 10:15	Break
10:15 - 11:30	Small Group Discussion • Identify major trends • Implications for VTAE • Strategies for responding to these trends

Evaluation

Participants evaluated the workshop at the end of the last of the last session. A summary of the results is presented in Table 1. All of the presentations received positive ratings. The highest ratings were given to Dr. James Bensen, President of Dunwoody Institute. Overall, the workshop received an above average rating.

An analysis of the written comments on the evaluation forms indicated that the participants appreciated the opportunity to discuss trends with other participants and work in small groups. The resources presented and identified also received many favorable comments.

A review of the suggestions for improving the workshop disclosed that the participants wanted more applications of the techniques and data presented. In addition, they suggested that the small group sessions be more varied and apply different forecasting techniques.

Table I
Evaluation Results for the
Trends and Forecasting Workshop

Presentations/Sessions/Resources	n=23	Evaluation Mean	Evaluation Std. Dev.
1. **Educational Trends** - Robert Ewy		3.5*	1.0*
2. **Changes in Vocational and Technical Education** - Neal Prichard		3.4	.7
3. **Changes in Manufacturing Companies** - Mike Closser		3.9	1.0
4. **Delphi Technique** - Orville Nelson		3.8	.7
5. **High Tech Trends** - James Bensen		4.8	.4
6. **Major Labor Market Trends** - Jerry Snow		3.3	.9
7. **How WBVTAE Uses Data in Policy Making** - James Halloran		3.0	.8
8. **Environmental Scanning** - Orville Nelson		3.5	.8
9. **Using Forecasts and Trends Data** - Stan Spanbauer		4.2	.6
10. **Using Forecasts and Trends Data** - Beverly Simone		3.8	.8
11. Small group discussion sessions		3.9	1.0
12. Facilities		4.7	.5
13. Food and snacks for breaks		4.8	.5
14. Notebooks and handouts		4.6	.7
15. Organization of the workshop		4.0	1.3
16. Overall evaluation of the workshop		3.6	1.0

*

1 = P = Poor
2 = BA = Below Average
3 = A = Average
4 = AA = Above Average
5 = E = Excellent

APPENDIX I

Contact Letters

September 27, 1989

<Name>
<School>
<Address>
<City>, <State>, <Zip>

Dear <CODE>

The Wisconsin State Board of Vocational, Technical and Adult Education and the Center for Vocational, Technical and Adult Education, University of Wisconsin-Stout are conducting a staff development workshop for staff in mid-management positions.

TRENDS AND FORECASTING WORKSHOP

November 13, 14 & 15, 1989
UW-Stout Memorial Student Center

The purposes of this workshop are to: (1) expand participants' knowledge of technological, labor market, and societal trends, (2) develop competency in generating forecasts; and (3) further develop their capacity to use this information in decision making and planning. Participants will receive information on trends and how the presenters identify these trends. They will also have an opportunity to learn more about using this information and these techniques in planning. Presenters are being selected from business, industry, and education.

Please select two mid-management level staff members to attend this workshop. If your district has more than one campus, please coordinate your selection of participants with the administrators of each campus. This workshop is similar to the one offered last April, therefore, you will probably want to send two people who did not attend that workshop. An overview of the workshop agenda is attached for your reference. After your participants have been selected, have them complete the enclosed registration form and return it to us as soon as possible. We want them to collect some trend data in your district. Thus, we need to contact them with instructions for this activity. The deadline for returning the registration form is October 25, 1989.

Credit Offered
One credit (either graduate or undergraduate) will be offered with tuition waived. A small UW-System segregated fee (graduate $10.40, undergraduate $13.28) will be the only charge if you want the credit. Registration for credit will occur at the workshop.

The workshop grant will cover lunches and breaks. Other meals, travel and lodging expenses are the responsibility of each VTAE district. There will be a general registration charge of $12.50 to cover the cost of the Monday evening dinner. Please complete the enclosed registration form and return it in the envelope provided by Wednesday, October 25, 1989. Call the Holiday Manor Motel for room reservations (715-235-9651). Rooms are: double-$48.00 (2 beds), single-$32.00. Poolside rooms are slightly more.

A confirmation letter will be sent to participants who complete the registration form attached prior to the workshop. We look forward to your district's involvement in this staff development activity. If you have questions, please contact Orville Nelson (715-232-1362) or Steve Schlough (715-232-3793).

Sincerely,

Orville Nelson, Co-Director
CVTAE, UW-Stout
218 Applied Arts Building
Menomonie, WI 54751

Howard Lee, Co-Director
CVTAE, UW-Stout

mw

Enclosures

cc: District Directors & State Board Staff
Jim Urness

APPENDIX II

Participant List

PEOPLE REGISTERED FOR TRENDS & FORECASTING WORKSHOP

Ann Bauer
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John Phillips, Dean
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Lois Van Meter, Chair
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Howard Lee
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UW-Stout
218 Applied Arts Building
Menomonie, WI 54751
(715) 232-1251 or 232-1382

APPENDIX III

B/I Survey Form

B/I INTERVIEW SURVEY

Directions: Interview people in two or three local businesses or industries. If possible, select B/I's that employ your graduates. Record the major comments on this form. You may want to ask other questions as well.

Business/Industry_____ Date_____

Address_____City_____Zip_____

Person(s) Interviewed:_____

Interviewer:_____

1. What are your major products/services? (If you already know, then go to question 2.)

2. How many people do you employ in this city or county? _____

3. What new technology are you using in your company? (New technology - equipment, processes, management techniques, etc.).

4. What new technology are you planning to use in the next 3 - 5 years?

5. What coming trends will affect the way you operate your company?

6. How do your employees develop new skills/competencies?

7. What additional skills do graduates from our school need as they start work with your company? (If possible, refer to a specific graduate or graduates from your school who have worked at this company.)

Over - use for extra notes.

APPENDIX IV

Workshop Handouts

FOCUS GROUPS

Focus groups are used to obtain a variety of ideas, suggestions, or perceptions from a small group of knowledgeable people. This technique has been used in marketing research, political campaigns, and evaluating educational programs and services.

A focus group is typically comprised of seven to ten people who are similar and have knowledge related to the topic to be discussed. Members of the group usually do not know each other prior to the focus group meeting.

The leader of a focus group tries to create a relaxed and open atmosphere. Participants are encouraged to share ideas and reinforce other group members. It is helpful to have an assistant leader who can help record ideas and comments.

Process for Using Focus Groups

- Preparing for a focus group.
    1. Determine the purpose of the group and types of information needed.
    2. Identify people who should participate in the focus groups. You may want to form more than one group.
    3. Prepare questions for the group
        a. open-ended questions
        b. about four to seven questions are needed
        c. ask people what or how they feel about the topic
        d. start with general questions and move to more specific ones.
- Conducting Focus Group Session
    1. Provide a general introduction to the purpose and format of the session.
    2. Use the first few questions to establish the context for the questions that follow.

. . . over . . .

3. Record the participants comments.

4. The group leader may probe

   a. A pause encourages a response

   b. A comment such as "could you give an example" or "would you give us more detail" encourage the group member to expand his/her comments.

- Analyzing Focus Group Results

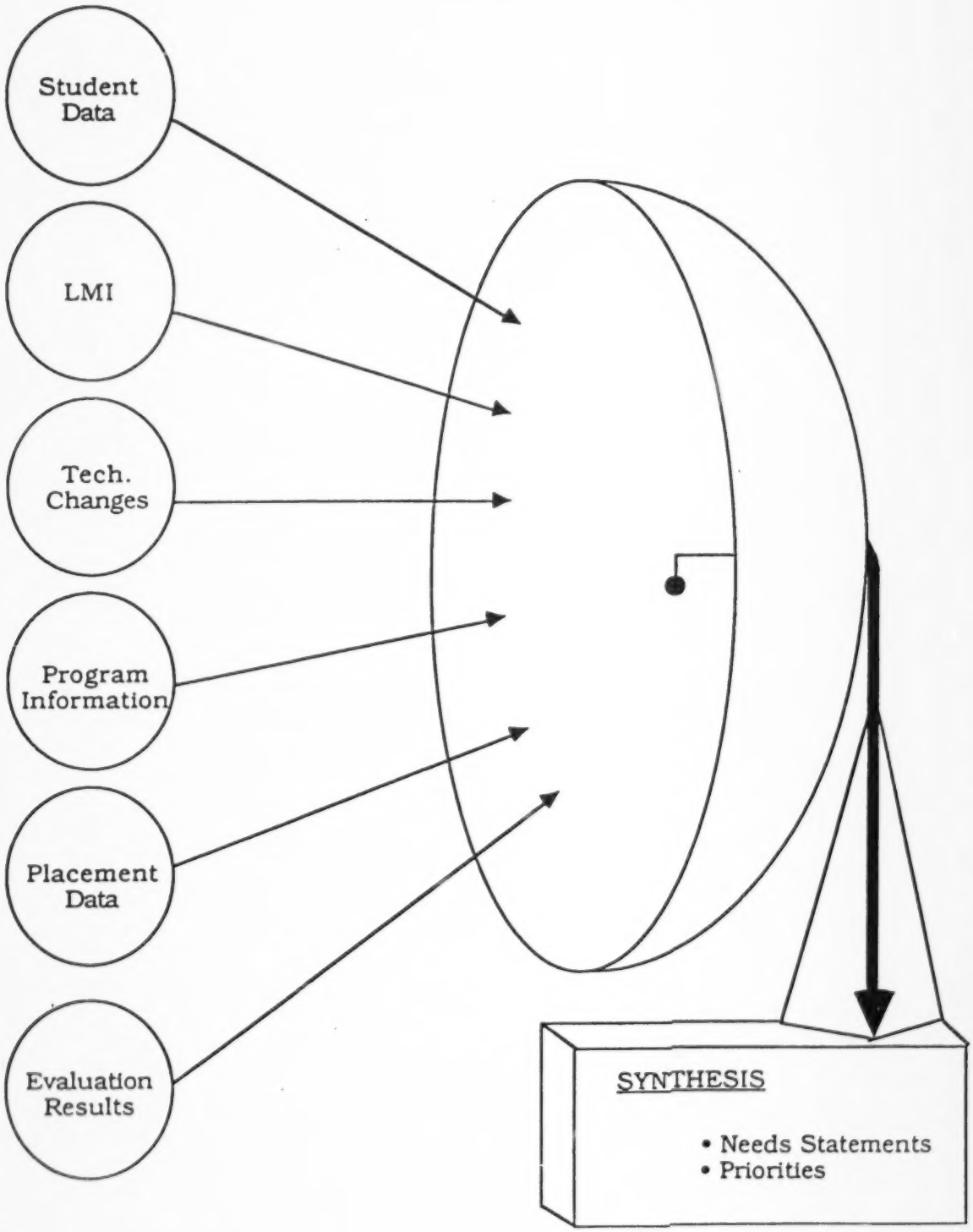
1. Analysis is done within the context of the purpose of the study.

2. The group leader and assistant leader should review their notes and clarify them as necessary.

3. Review the comments and suggestions. Look for patterns and repetition. Determine the frequency that certain comments are made.

4. If additional focus groups are used, check for consistency across groups.

VOCATIONAL NEEDS SCANNING



Vocational Needs Scanning

I. Introduction

A need occurs when there is a difference between what is and what should be. For example, if an entry level secretary should be able to use word processing software but has not received instruction on word processing, there is a discrepancy between the competencies this person has and those that are required on the job. This discrepancy is a need. The larger the discrepancy, the greater the need.

The vocational needs scanning process involves a continuous scanning of several areas or factors that influence vocational education programs to determine what should be. This information is then compared with the characteristics and output of the vocational program to identify any discrepancies that exist.

As noted previously, this is an ongoing program. All staff members involved with the vocational program, advisory committee members, and graduates are involved in the process to some extent. The scanning process does not involve recording a large amount of data periodically, instead the process is one of collecting and analyzing a small amount of data on a regular basis.

II. Needs Scanning Concept

An effective needs assessment program must be on-going. Areas that influence vocational programs should be scanned or monitored on a continuous basis. Scanning is a process of regularly checking a selected set of factors that influence the design and content of vocational programs to determine what changes are occurring. Scanning is done as a part of one's normal work activities. The result of the scanning process could be a decision that the program is operating effectively; or, that one or more needs exist.

The development of computer technology and software provides an appropriate example of how the scanning process works. The first computer was developed in the 1940's. A scan of this development would indicate that the equipment was too costly and programs too limited to be relevant to vocational programs. Later scans would reveal that new developments in technology and software made the computer relevant to some vocational programs. For example, there was a growing need for programmers in the 1970's. Scans in the early 1980's identified rapidly increasing use of PC's and the growing volume of user friendly software. Computers now had implications for any vocational areas that used, manipulated and/or stored information.

Once a scan indicated that computers were relevant to vocational education, a needs assessment technique that goes in greater depth could be used to determine if new programs should be designed and/or what competencies should be added to existing programs. For example, a task analysis could be done to ascertain what tasks and competencies are required to perform a computer related job.

In review, the scanning process continuously monitors areas or factors that influence vocational programs. When a scan leads to the decision that a potentially important event has occurred or a change has taken place, a more detailed needs assessment is done. The following areas should be monitored.

- Student Data
- Labor Market
- Technological Changes
- Program Information
- Placement Data
- Evaluation Results
- Demographic Trends

This probably sounds like a lot of work. However, remember that the monitoring process is carried out as a part of your regular activities. For example, the scans that indicated the growing importance of computers probably involved the following.

- Noting the growing number of articles on computers and computer applications given in professional and technical literature.
- Observing the growing number of computers displayed in convention exhibits and discussed in presentations.
- More frequent reference to computers by advisory committee members.
- An increased number of comments from graduates on the need to include instruction on computers in their school's vocational program.

The next section describes scanning techniques for each of the six areas that influence vocational programs. These techniques are presented as examples. You may wish to modify, add, and/or delete some of these.

III. Monitoring Techniques

This section will suggest a variety of monitoring processes that can be used. References for the documents and publications listed are given at the end of this section.

A. Student Data

The scan on student data should focus on their career development progress, extent to which they are developing competencies related to their career choices, and the degree to which performance in school matches their abilities. Societal changes that influence students and their families should also be monitored. Several areas to monitor are given below.

1. Career choices and interests. Most schools have an assessment program that will provide this information. If program or grade level summaries are not available, encourage your school to purchase them.

    a. Review the summary to identify the interest and ability patterns of students in your vocational and technical programs.

    b. Ask your counselors and teachers to give you their perceptions of the proportion of students whose job choices do not match their abilities and interests.

2. Validity of career choices and preparation. Check the graduates' follow-up surveys to determine the proportion that work in jobs related to their vocational preparation.

3. School performance. Discuss student performance and morale with teachers and counselors. Review absenteeism and dropout data. Are these rates increasing and/or too high?

4. Societal changes. Are there changes in society that affect your students? Do you have more students from single parent families? Do you have more non-traditional students?

B. Labor Market Information. Information on your local and regional labor market should be monitored to identify trends and changes related to your vocational programs.

1. DILHR Publications

a. Wisconsin Economic Indicators, Madison: DILHR. Published monthly. Address: 201E. Washington Avenue, P.O. Box 7944, Madison, WI 53707. Also ask to be placed on the mailing list for the Wisconsin Employment Picture. Both are free.

b. Wisconsin Employment Picture, DILHR, Madison.

c. The following documents were developed by DILHR and are available for each SDA.
- Planning Information for Employment Training and Industrial Development.
- Industrial and Occupational Projections to 1995.
- Wisconsin Economic Planning Report 1988.

d. Documents available from the Minnesota Department of Jobs and Training. (612/296-6545)
- Minnesota Labor Market Review (Quarterly)
- Review (8 issues/year)

2. Review the summaries for your county and surrounding counties in your labor market area.

a. Contact your local labor market analyst. See appendix A for addresses and phone numbers.

3. Advisory Committees. Once a year ask your advisory committees to identify changes in your labor market - new jobs, jobs that are decreasing in number, jobs that need a large number of new workers to replace retirees.

4. Job Service and PIC. Visit with the staff at your local Job Service Office and PIC and discuss their labor market data.

5. Graduate Follow-up results. Review the follow-up data to determine if graduates from your vocational program are employed in jobs for which they were prepared. If not, what type of jobs are they acquiring?

C. Technological Changes. Changes in the equipment, tools, and processes used in the jobs related to your programs needs to be monitored on a systematic basis.

1. Vocational Teachers. Your staff needs to monitor technological changes as they review their professional and technical literature, attend conventions, and take graduate courses.

2. Advisory Committees. A portion of each advisory committee meeting should be used to identify new technology and its implications for your programs. Once each year you should ask each advisory committee to look ahead for two to three years and project potential technological changes in their areas.

3. Employer Feedback. Ask the employers of your coop students and graduates to identify new technology they are bringing into their businesses.

D. Program Information

1. Teacher Feedback. Ask your vocational teachers to identify weak and strong points in your vocational program.

2. Enrollment Patterns. Review the enrollment patterns for each vocational area to determine

   - decreases in enrollment
   - changes in the percentage of males and females
   - current percentage of males and females
   - percentage of students that drop or fail

3. Curriculum. Review your courses of study, student learning materials, and evaluation processes with your teachers. Determine if these materials reflect current technology and practice in B/I. Also, ascertain if the student learning materials are effective.

4. Equipment and Facilities. Review and discuss with your staff. Determine if your equipment is up-to-date, adequate and properly maintained.

5. Advisory Committee Perceptions. Ask your advisory committees to review program objectives, instructional materials, equipment and facilities and suggest areas where changes are needed.

6. Parent Perceptions. Our data indicate that parents have an important impact on their son's and daughter's career choices. You should monitor their perceptions of your vocational programs and provide them with information that will be useful as they counsel and encourage their children.

E. Placement Data. Follow-up surveys of graduates can provide a lot of valuable data. Including all graduates in the follow-up study will improve the usefulness of the data. Some of the results to check are

- Percentage of graduates who are unemployed
- Percentage of vocational graduates who are in related jobs or educational programs
- Unique jobs held by vocational graduates. These could be opportunities for new vocational programs.
- Employer suggestions that identify additional competencies needed by your graduates
- Graduates' suggestions for new content in your program.

F. Evaluation Results. During a program evaluation process a number of needs may be identified.

1. Self-Evaluation Findings. During the process of developing the self study report, one or more needs are often identified. Be sure to record these and keep them for further discussion.

2. On-Site Team Recommendations. The conclusions and recommendations of the evaluators can be helpful. These are based on the data collected in your self-evaluation, on-site interviews, and the perspectives of the evaluators. One of the values of these recommendations is that they bring in another perspective or point-of-view.

IV. Using Vocational Needs Scanning Data

The Vocational Needs Scanning process provides ideas, trends, and information that can be used to identify and prioritize needs. Usually this information will have to be analyzed in more detail in order to establish specific needs and identify priorities.

Often it is helpful to have advisory committees and vocational teachers review and discuss the data from the needs scanning process. They can help to establish criteria for judging the magnitude of each

need in relation to your vocational program. These criteria might be similar to one or more of the following.

- Potential impacts on the employability of your graduates
- Degree to which the need hinders learning in your program
- Number of students affected
- Extent to which the need influences access to your vocational program
- Potential for developing a new program.

The group should then use this criteria selected to place priorities on each need.

In some instances the vocational needs scanning process may define needs in sufficient detail to provide enough information to make specific program changes. However, many times the scanning process will provide a signal that there is a potential need. When this occurs, a more specific needs assessment study will need to be done in the need area. For example, a scan may indicate that your graduates need more computer skills. A task analysis would be needed to identify the specific competencies needed.

If you need more information on specific needs assessment techniques, such as task analysis/DACUM, labor market analysis, and student assessments, contact the Center for Vocational, Technical and Adult Education for more information.

Howard Lee - (715) 232-1251

Orville Nelson - (715) 232-1362

Trends and Forecasting Workshop

Directions: Please respond to the following items based on your experience in this workshop. Use the following responses.

1 = P = Poor
2 = BA = Below Average
3 = A = Average
4 = AA = Above Average
5 = E = Excellent

Presentations/Sessions/Resources	Evaluation				
	P 1	BA 2	A 3	AA 4	E 5
1. **Educational Trends** - Robert Ewy	1	2	3	4	5
2. **Changes in Vocational and Technical Education** - Neal Prichard	1	2	3	4	5
3. **Changes in Manufacturing Companies** - Mike Closser	1	2	3	4	5
4. **Delphi Technique** - Orville Nelson	1	2	3	4	5
5. **High Tech Trends** - James Bensen	1	2	3	4	5
6. **Major Labor Market Trends** - Jerry Snow	1	2	3	4	5
7. **How WBVTAE Uses Data in Policy Making** - James Halloran	1	2	3	4	5
8. **Environmental Scanning** - Orville Nelson	1	2	3	4	5
9. **Using Forecasts and Trends Data** - Stan Spanbauer	1	2	3	4	5
10. **Using Forecasts and Trends Data** - Beverly Simone	1	2	3	4	5
11. Small group discussion sessions	1	2	3	4	5
12. Facilities	1	2	3	4	5
13. Food and snacks for breaks	1	2	3	4	5
14. Notebooks and handouts	1	2	3	4	5
15. Organization of the workshop	1	2	3	4	5
16. Overall evaluation of the workshop	1	2	3	4	5

17. What did you like best about the workshop?

18. What could be improved?

CVTAE 11/14/89

Delphi Round 2

Name_____ Date_____

DIRECTIONS: Please rate the likelihood of each of the following trends. Use your information, experience and best judgment when you complete this survey. Select one of the following response choices.

1 = NO = NO Chance (0%)
2 = 1/10 = One Chance in 10
3 = 1/4 = One Chance in 4
4 = 1/2 = One Chance in 2 (50/50)
5 = 3/4 = Three Chances in 4
6 = 9/10 = Nine Chances in 10
7 = 100 = Definitely will occur

	Likelihood						
	NO 1	1/10 2	1/4 3	1/2 4	3/4 5	9/10 6	100% 7
1. Education will be remunerated based upon quality of the product	1	2	3	4	5	6	7
2. Nontraditional students will be the traditional student	1	2	3	4	5	6	7
3. Regional (more than <u>one</u> district) planning for development of training programs will be common	1	2	3	4	5	6	7
4. There will be a greater need for basic skills and remedial training by the year 2000 (50%)	1	2	3	4	5	6	7
5. There will be more, at least 32% older people (50+) in the work force by the year 2000	1	2	3	4	5	6	7
6. There will be an increase of 47% in the number of women in the work force by the year 2000	1	2	3	4	5	6	7
7. By the year 2000, the majority of new work force entrants will be minorities and immigrants.	1	2	3	4	5	6	7
8. The role of the VTAE mid-manager in the year 2000 will be that of a facilitator with greater responsibilities directly related to business/industry.	1	2	3	4	5	6	7

. . . over . . .

		Likelihood						
		NO	1/10	1/4	1/2	3/4	9/10	100%
		1	2	3	4	5	6	7
9.	As the number of high school drop-outs increases, there will be a greater need for adult basic education.	1	2	3	4	5	6	7
10.	The private sector will deliver technical education by the year 2000. .	1	2	3	4	5	6	7
11.	Increased emphasis in employee participation and problem solving will require curricular changes to include transferable skills, team building, work ethic, critical thinking, etc.	1	2	3	4	5	6	7
12.	Environmental pressures/concerns/ hazards will redefine the quality of life and standards of operations in production	1	2	3	4	5	6	7
13.	Technological literacy and computer-ization applications will redefine basic skills at a higher level	1	2	3	4	5	6	7
14.	Global interrelatedness will demand increased curricular emphasis on under-standing global impacts, such as economy, health, competition	1	2	3	4	5	6	7

DELPHI TECHNIQUE

Building A Quality Workforce: A National Priority for the 21st Century Conference

Milwaukee, Wisconsin

October 22, 1989

by

Orville Nelson

University of Wisconsin-Stout
Menomonie, Wisconsin

DELPHI TECHNIQUE

History and Overview

The Delphi Technique was developed after World War II to provide a process for predicting future events. Since the technique was released to the public, it has been applied in a number of ways for a variety of purposes. Typically, it has been used in one of two ways. Either it has been used to gain consensus on future events or it has been employed to derive consensus on present problems or priorities.

The Delphi Technique was designed to collect expert thinking and provide a process for achieving group consensus. The process was designed to minimize the impact of personalities on the thinking and decisions of the group or panel of experts. The panel of experts is selected to provide expertise related to the problem being studied. Olaf Helmer, one of the developers of the Delphi Technique, describes it in the following way:

> Its objective is to obtain the most reliable consensus of opinion of a group of experts. It attempts to achieve this by a series of intensive questionnaires interspersed with controlled opinion feedback (1983,135).

Usually, the Delphi process starts with one or more general questions related to the problem or topic being studied. For example, if a study were being made to predict the nature of our society in the year 2025, one might include a question, "What will transportation be like in the year 2025?" The panel of experts would then write comments giving their views of the nature of transportation at this future point in time. It is important that these questions be general so they do not direct the thinking of the respondent. Some argue that the use of these general questions can change the thinking of the jury; however, some stimulus is needed to direct them to the area being studied.

The responses to the first round of the Delphi Study are synthesized into a series of statements related to the problem or topic being studied. These statements are placed in a rating scale or survey and sent back to the jury members for their evaluation. If one were predicting the likelihood of events at some point in time, the respondents would indicate the probability of occurrence; or, they might predict the year or date by which the event will occur. After the panel members' responses have been received, the researcher summarizes the results and determines the area of consensus on each item.

For the third round, the researcher provides the respondents (jury/panel members) with a summary of the responses from the second round. Panel members are requested to consider those items on which their responses are not within the area of consensus. When a response is not in the area of consensus, the respondents have a choice of changing their responses to one which is within the consensus area or writing an argument for retaining the original response. It is important to emphasize that each panel member is making his/her decisions in private and does not know who has made the other responses. Therefore, personalities and reputation have minimum impact. Responses on the third round are then summarized by the researcher.

If a fourth round is used, respondents have a choice of modifying their responses to move them within consensus or to write a counter argument for the opposite response. A high level of consensus is usually achieved by the end of the fourth round. In fact, consensus is usually high after the third round.

Delphi Procedures

The following activities are involved in a typical Delphi Study.

Activity 1: State the purpose of the study. Identify the topic or problem area to be studied and the type of product to be developed. In other words, identify the overall goal of the project.

Activity 2: Select the panel of experts. Select people who have expertise related to one or more facets of the problem area. This is not a random sample. You will select people who can contribute to the study. Determine the types or areas of expertise needed and seek your panel members from these areas. As you identify these areas, remember that problems usually cut across several disciplines or areas of expertise. Usually persons' reputations and accomplishments are used to determine their level of expertise. Since the Delphi process takes a while to complete, it is important to select experts who will be available while the surveys are being conducted.

Activity 3: Round 1 - Identify projected changes, trends, and events. Send a general question(s) to the panel of experts. Typically all rounds of the Delphi study will be done by mail. However, there is potential to use an interactive computer system to conduct the Delphi survey. Panel members do not convene and work as a committee. This approach is used to minimize the impact of personality and reputation on other committee members.

Activity 4: Round 2 - Collect expert opinion on all statements. Responses to Round 1 are synthesized into a series of statements or questions related to the problem or topic studied. These are placed in a rating scale and sent to the panel members. Their responses are summarized and a consensus area is determined for each item. The consensus area may be the median, mode, average or plus or minus one standard deviation from the typical response.

I usually use the median as the measure of the typical response.

It is influenced less by extreme responses and indicates the point on the response scale where one-half of the responses are above and one-half are below. The consensus area for a set of responses may be one or several response points on the scale. I base my decision on:

- The nature of the distribution. If two adjacent response choices have similar numbers of responses, both are included in the area of consensus.
- The response choices included in the consensus area should be compatible.
- The consensus area should be small enough to encourage panel members to move toward a higher level of consensus.

Example

A study of technological change identifies voice input for computers as a significant change as a part of round 1. The round 2 survey statement and outcome is given below.

1. Voice input will be functional and available for most PC models

by:	1990	1995	2000	2005	2010
Results: (% panel members)	10	40	35	10	5

The results have been summarized and placed after the statement. One-half of the panel members think that voice input will be available by 1995. Since the percentage of respondents was similar, the consensus area was identified as 1995-2000. This area is small enough to encourage twenty-five percent of the experts to reconsider their responses and either change them to the area of consensus or justify their responses.

Activity 5: Round 3 - Ask panel members to justify or change their out-of-consensus responses. Panel members receive their Round 2 survey instrument and have two choices of action on items where their Round 2 responses were outside of consensus. One, they can change their responses to be within consensus; or two, they can justify their

original responses. Results to the third round are summarized in the same way as those to the second round. In addition, a summary of the written comments is developed.

To simplify the task of the panel members, we circle the statement numbers for those items on which their responses are outside the area of consensus. A separate color is used for each round. In addition, the consensus area is identified with a box as shown in the example. The box is also color coded for each round.

Activity 6: Round 4 - Ask panel members to change out-of-consensus responses or write counter arguments. Panel members receive their Round 3 responses and have two choices for items on which their Round 3 responses were outside consensus. One, they can change their responses to the consensus area; or two, they must write a counter argument to the reasons given for the responses out of consensus at the other end of the continuum. Results from this round are processed as in similar rounds. However, counter arguments are available and need to be summarized. It is easier to analyze the results if the arguments and counter arguments are given in side-by-side columns and paired.

Activity 7: Use the results. Several levels of results are now available for use in decision making.

- High Consensus - All or almost all panel members are in the consensus area for a trend/projection. This indicates a consistent view of the future. Decision making should be easier when this occurs. However, remember that these are <u>estimates</u>.
- Moderate Consensus - A significant number of panel members' responses are outside the consensus area. You will have to contrast the justifications and counter arguments to determine the best prediction for these trends.
- Polar response patterns - Sometimes the response patterns will form two areas of consensus. One potential cause of this is a statement that is interpreted in two different ways by the panel members. Panel members responses on Round 3 should reveal if this is the cause. If this is the cause, the statement will need to be clarified.

When using the results of a Delphi study, one must keep in mind

that these are projections. The longer the time span of the projection, the less accurate the projections are likely to be. One must continue to monitor the trend over time to determine if it is progressing as projected or is changing course.

Our Center has used the Delphi process in a variety of studies. We have been very satisfied with the results. For most part, results have been on target. For example, in a study by Arora (1975), one of the projections was that fifty percent of our homes would have computers by 1985. Some of the projections have been less accurate; however, we have never been embarrassed by the accuracy of any of the projections. An added side benefit of the Delphi Process was summarized by one of our staff members as, "The most important outcome was the fact that this caused me to look at the future in a systematic way."

Applications of the Delphi Technique

In addition to forecasting future events and trends, the Delphi technique has been used in other types of studies. Several of these applications are noted below and the references are coded to identify the type of application.

- Forecasting events and trends. (Original purpose)
- Needs analysis
- Curriculum planning
- Market research
- Setting standards
- Establishing organizational objectives
- Developing policy

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#CODES:

C = Curriculum Planning Development
ED = Education
EV = Evaluation
F = Forecasting
MR = Market Research
NA = Needs Analysis
O = Establishing Objectives
P = Policy Development
SS = Setting Standards

October 17, 1989

APPENDIX A

COVER TO FORECASTING COMMITTEE FOR THE HIGH-TECHNOLOGY PROJECT

Dear:

We appreciate your willingness to participate on our Forecasting Committee for High-Technology Training Model Project. This is an exciting opportunity to study how forecast can be used to make curriculum and training decisions. Your input will play an important part in this process.

Round One

We are going to start out by applying the Delphi Technique to our forecasting process. The first round survey is enclosed for your response. As we progress with the study during the next year, we will consider other forecasting techniques. If you would like to suggest some procedures which you feel would be productive, please feel free to do so. The purpose of the survey enclosed is to identify trends in the areas of technology, work/management systems, and society. We would like to have you identify the three or four most important changes that you feel will occur in the next ten years in these areas. If you can only list one or two, that is okay. The other members of the committee will add additional comments.

Future Rounds

Our project staff members will summarize the trends and changes identified on the survey. These will be used to develop the second survey which will be forwarded to you during the later part of November. At that time you will have an opportunity to react to each of the trends/changes identified.

If you have any questions, please contact us.

Sincerely yours,

Orville Nelson
Project Director
(715) 232-1362

Tim Mero
Research Associate
(715) 232-3793

Enclosure

mmo

TRENDS SURVEY

DIRECTIONS: Identify the major changes and trends that will occur by the year 2000 in each of the areas noted below. List the changes/trends that come to mind as you read each question. You do not need to do any special research to complete this survey.

1. What changes/trends will occur in the technology used by business and industry by the year 2000?

2. What changes/trends will occur in work and management systems by the year 2000?

3. What changes will occur in society by the year 2000 that will have significant impacts on business and industry?

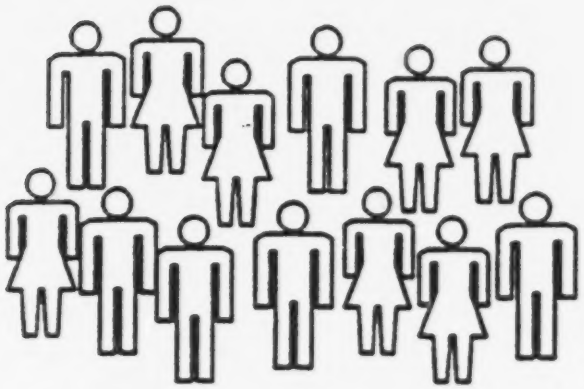
4. What other changes will occur by the year 2000 that will have significant impacts on business and industry?

Thank you. Please return to:

Tim Mero
University of Wisconsin-Stout
219 Applied Arts Building
Menomonie, WI 54751

LABOR MARKETS BRING TOGETHER

JOB SEEKERS



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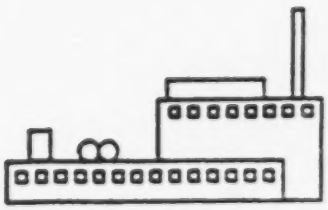
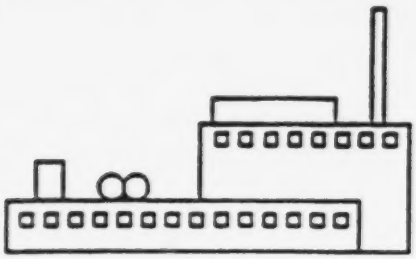


EMPLOYERS

Source: Wisconsin Department of Industry, Labor and Human Relations, Bureau of Labor Market Information; March, 1988

A LABOR MARKET

MAY BE AS SMALL AS



AN INDIVIDUAL ESTABLISHMENT

A CITY OR TOWN

OR AS BIG AS THE WORLD

Source: Wisconsin Department of Industry, Labor and Human Relations, Bureau of Labor Market Information; March, 1988

THE SIZE OF A LABOR MARKET FOR A SPECIFIC OCCUPATION DEPENDS ON

* THE NUMBER OF JOBS IN AN AREA REQUIRING A SPECIFIC SET OF SKILLS AND ABILITIES

* THE NUMBER OF PEOPLE IN AN AREA WITH THE APPROPRIATE SKILLS

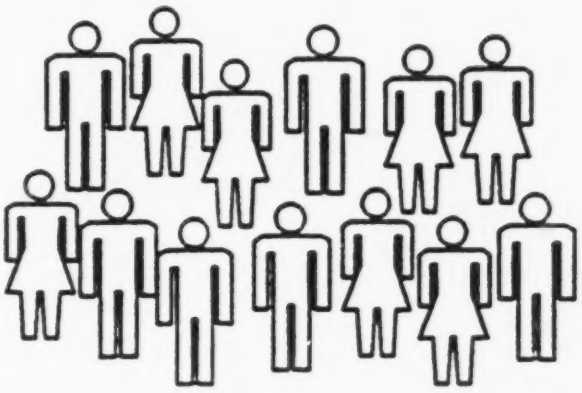
* THE WILLINGNESS OF PEOPLE TO RELOCATE OR COMMUTE TO THE AVAILABLE JOBS

Source: Wisconsin Department of Industry, Labor and Human Relations, Bureau of Labor Market Information; March, 1988

LABOR MARKET INFORMATION
IS ABOUT

THE WAGES, BENEFITS, AND WORKING CONDITIONS EMPLOYERS PROVIDE

THE TRAINING, EXPERIENCE AND SKILLS JOB SEEKERS BRING

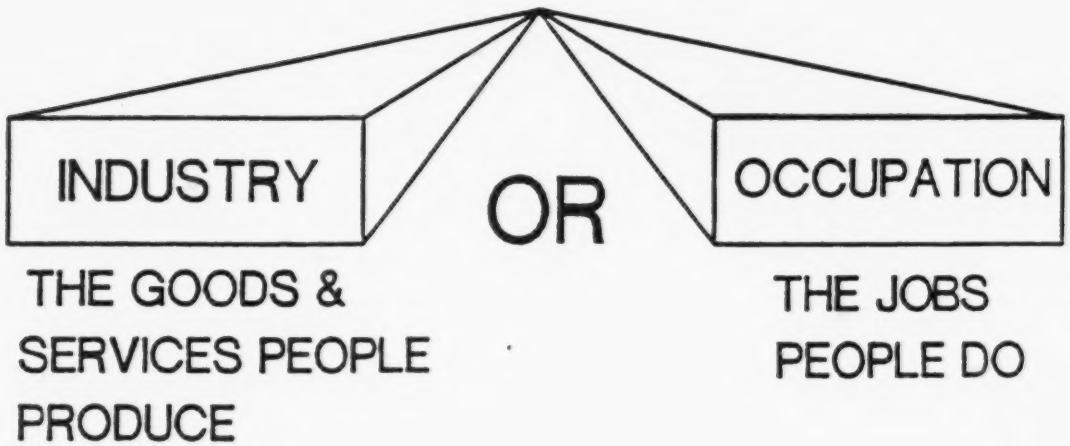


WCIS

Resume' system

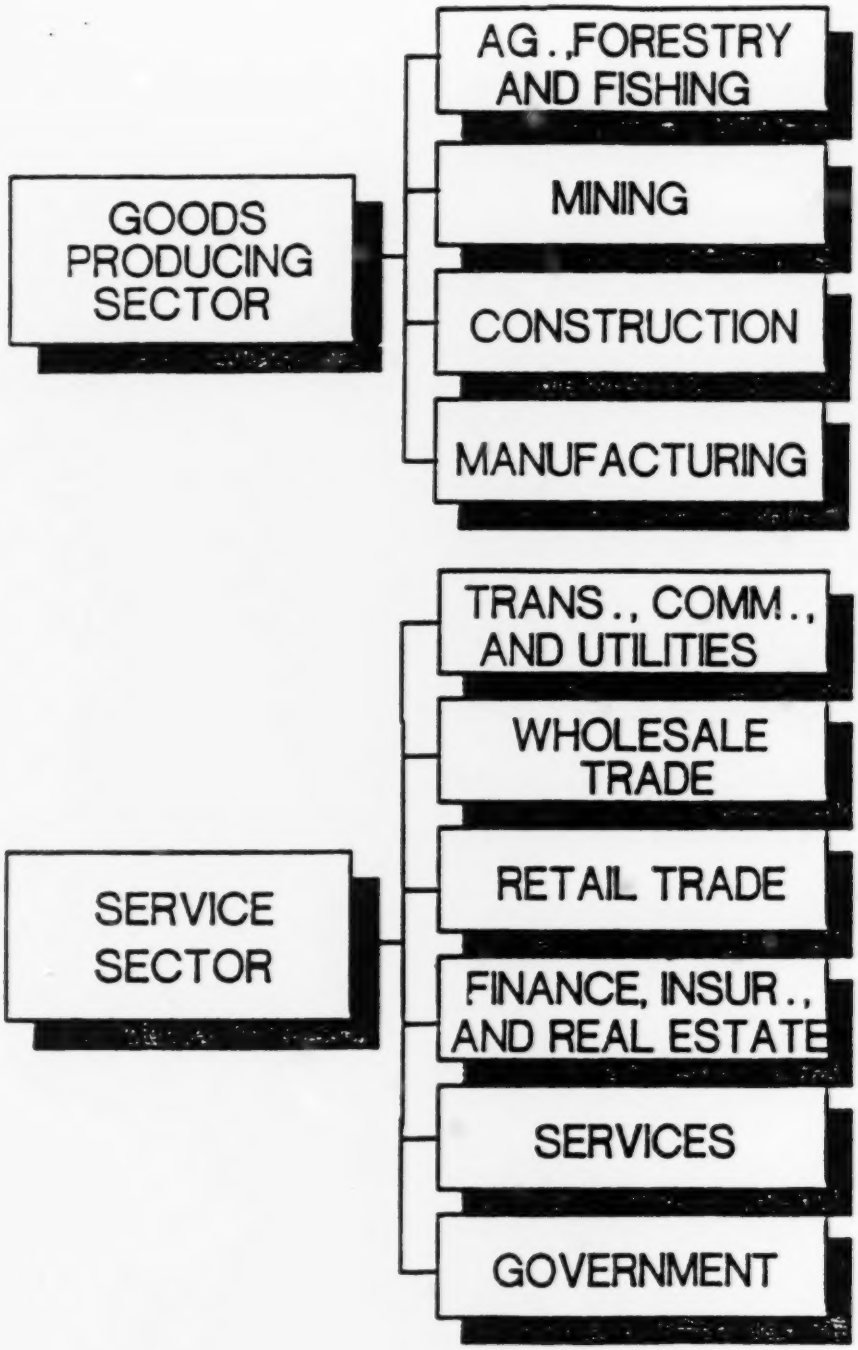
Source: Wisconsin Department of Industry, Labor and Human Relations, Bureau of Labor Market Information; March, 1988

MOST INFORMATION ABOUT THE LABOR MARKET IS CLASSIFIED BY



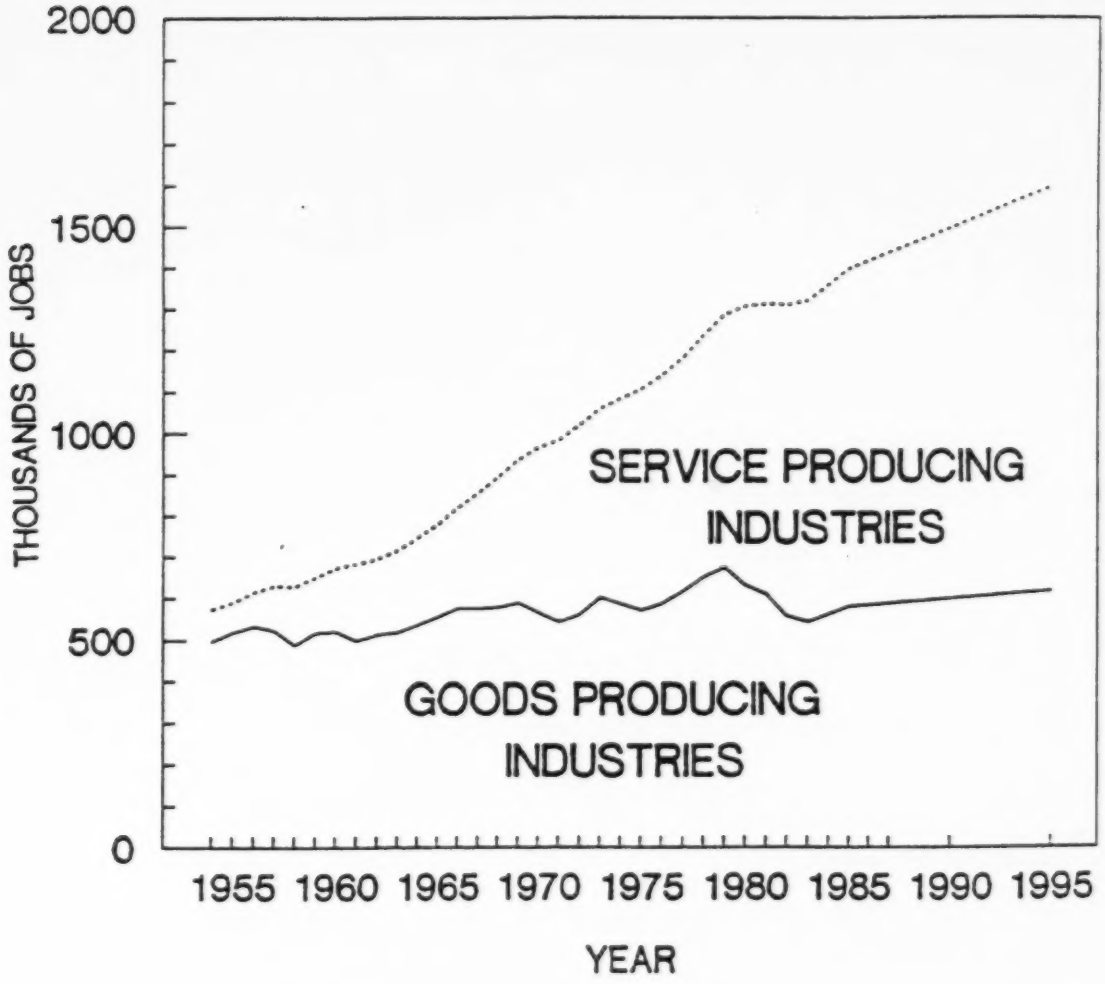
Source: Wisconsin Department of Industry, Labor and Human Relations, Bureau of Labor Market Information; March, 1988

INDUSTRIES
ARE CLASSIFIED BY SECTOR AND DIVISION



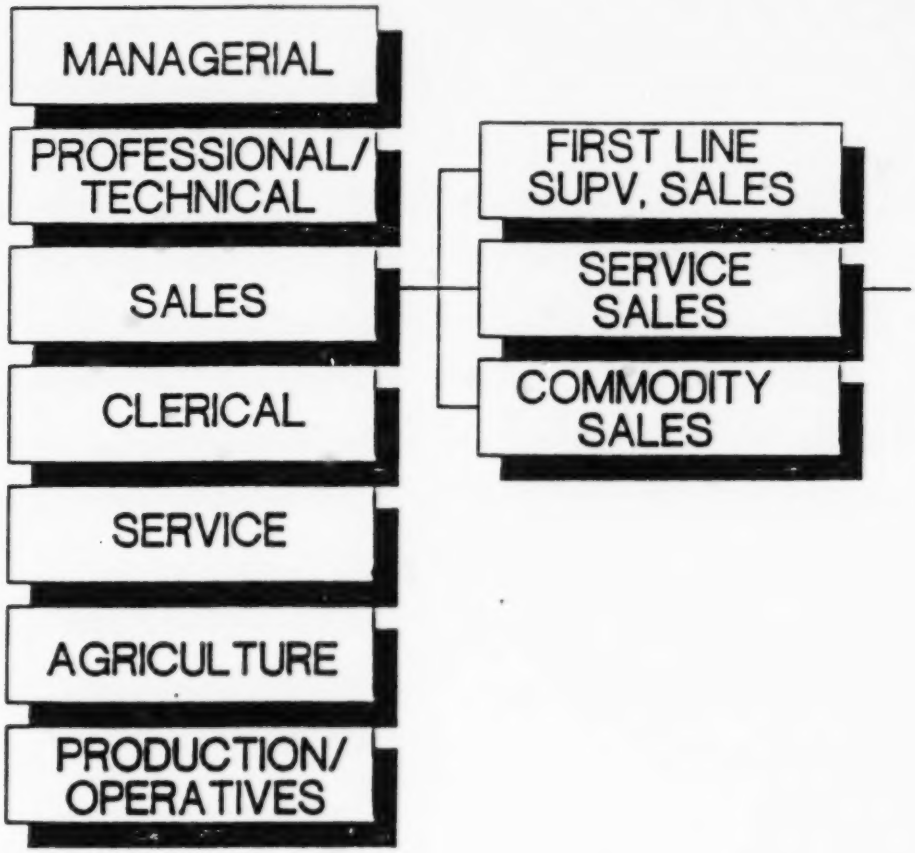
Source: Wisconsin Department of Industry, Labor and Human Relations, Bureau of Labor Market Information; March, 1988

CONTINUED EXPANSION OF THE SERVICE SECTOR WILL PROVIDE MOST NEW JOBS IN WISCONSIN



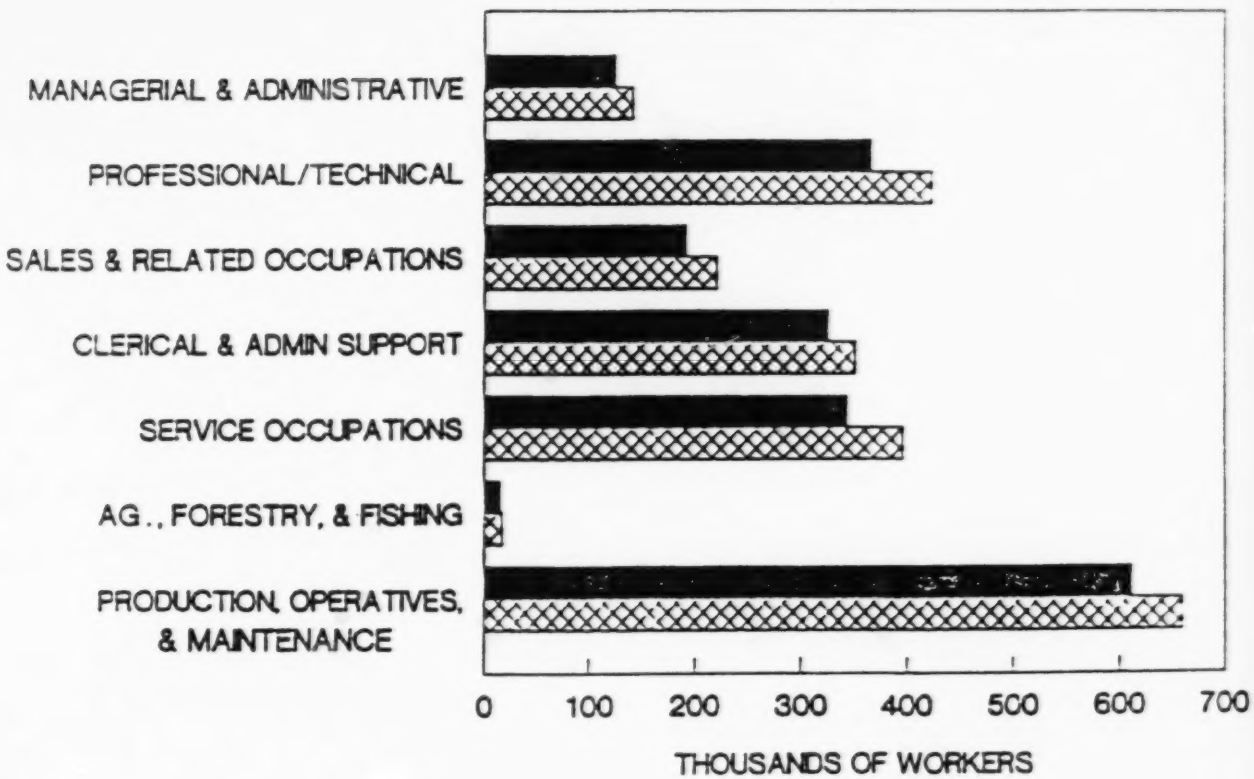
Source: Wisconsin Department of Industry, Labor and Human Relations, Bureau of Labor Market Information; March, 1988

OCCUPATIONAL EMPLOYMENT SURVEY STRUCTURE



Source: Wisconsin Department of Industry, Labor and Human Relations, Bureau of Labor Market Information; March, 1988

FEW CHANGES ARE EXPECTED IN WISCONSIN'S OCCUPATIONAL STRUCTURE BETWEEN 1985 AND 1995



Source: Wisconsin Department of Industry, Labor and Human Relations, Bureau of Labor Market Information; March, 1983

OCCUPATIONS WITH LARGEST JOB GROWTH IN WISCONSIN 1985-1995

OCCUPATION	Change in employment Number	Percent
CASHIERS	9617	25.5
REGISTERED NURSES	8665	31.4
RETAIL SALESPERSONS	8040	13.0
WAITERS AND WAITRESSES	7301	16.6
GENERAL MANAGERS AND TOP EXECUTIVES	6677	12.8
ALL OTHER SECRETARIES	6533	13.1
JANITORS AND CLEANERS, EXC.MAIDS	5831	14.3
BARTENDERS	5411	19.3
NURSING AIDES AND ORDERLIES	5387	15.1
ACCOUNTANTS AND AUDITORS	3460	24.3
ALL OTHER MANAGERS & ADMINIST.	3458	20.3
FOOD PREPARATION WORKERS	3062	15.5
SALES REPS.EXC.SCIENTIF & RETAIL	2809	13.5
GENERAL OFFICE CLERKS	2702	6.1
MAINTENANCE REPAIRERS, GEN.UTIL	2700	13.5
ALL OTHER PROF.,PARAPROF.,TECHN.	2568	14.8
BOOKKEEPING & ACCOUNTING CLERKS	2433	6.5
TEACHERS, ELEMENTARY	2417	9.2
ALL OTHER ASSEMBLERS, FABRICATOR	2400	7.9
HAIRDRESSERS AND COSMETOLOGISTS	2260	22.1
TRUCK DRIVERS, HEAVY	2169	7.7
RESTAURANT COOKS	2125	20.3
MAIDS AND HOUSEKEEPING CLEANERS	2050	18.8
TRUCK DRIVERS, LIGHT	1941	12.4
AUTOMOTIVE MECHANICS	1910	15.7

Source: Wisconsin Department of Industry, Labor and Human Relations, Bureau of Labor Market Information; March, 1988

FASTEST GROWING OCCUPATIONS IN WISCONSIN
1985-1995

OCCUPATION	Percent Change
PARALEGAL PERSONNEL	47.7
ACTUARIES	42.8
ELECTRICAL & ELECTRONIC ENGINEER	34.8
MEDICAL ASSISTANTS	34.6
FARM WORKERS	34.1
COMPUTER SYSTEMS ANALYSTS, EDP	33.6
REGISTERED NURSES	31.4
DATA ENTRY KEYERS, COMPOSING	30.3
ELECTRICAL & ELECTRONIC TECHNS.	30.0
DATA PROCESSING EQUIP. REPAIRERS	29.7
MEDICAL RECORDS TECHN.& TECHNOL.	29.4
ELECTROCARDIOGRAPH TECHNICIANS	29.2
CHILD CARE WKRS., PVT. HOUSEHOLD	26.9
VETERINARIANS, VET. INSPECTORS	26.8
USHERS, LOBBY ATT., TICKET TAKER	26.3
ARTISTS AND COMMERCIAL ARTISTS	26.1
OCCUPATIONAL THERAPISTS	26.1
PHYSICAL THERAPISTS	26.0
SURGICAL TECHNICIANS	25.7
CASHIERS	25.5

Source: Wisconsin Department of Industry, Labor and Human Relations, Bureau of Labor Market Information; March, 1988

OCCUPATIONS WITH MOST ANNUAL OPENINGS IN WISCONSIN 1985-1995

OCCUPATION	Annual Openings due to growth	due to separations	Total
RETAIL SALESPERSONS	804	3263	4067
JANITORS AND CLEANERS, EXC.MAIDS	583	3146	3729
GENERAL MANAGERS AND TOP EXEC.	668	2292	2960
GENERAL OFFICE CLERKS	270	1737	2007
CASHIERS	962	992	1954
BOOKKEEPING & ACCOUNTING CLERKS	243	1615	1858
BARTENDERS	541	1283	1824
NURSING AIDES AND ORDERLIES	539	1266	1805
REGISTERED NURSES	867	762	1629
WAITERS AND WAITRESSES	730	609	1339
SALES FLOOR STOCK CLERKS	173	1054	1227
FOOD PREPARATION WORKERS	306	895	1201
SALES REPS.EXC.SCIENTIF & RETAIL	281	901	1182
MAIDS AND HOUSEKEEPING CLEANERS	205	873	1078
MAINTENANCE REPAIRERS, GEN. UTILITY	270	734	1004
ELEMENTARY SCHOOL TEACHERS	242	703	945
TRUCK DRIVERS, HEAVY	217	711	928
GUARDS AND WATCH GUARDS	102	771	873
ACCOUNTANTS AND AUDITORS	346	438	784
SECONDARY SCHOOL TEACHERS	182	601	783
GARDENERS AND GROUNDSKEEPERS	127	574	701

Source: Wisconsin Department of Industry, Labor and Human Relations, Bureau of Labor Market Information; March, 1988

Planning Information
for
Employment, Training and Industrial Development

Wisconsin State-Level Statistical Report

1989

Wisconsin Department of Industry, Labor and Human Relations
Division of Employment and Training Policy

Labor Market Information Bureau

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APPENDIX V

Discussion Session Results

"Application of Trends and Forecasting Data"

APPLICATIONS OF TRENDS AND FORECASTING DATA
WEDNESDAY SESSION

Two major questions:

A. How can I use trends and forecasting data in my unit?

B. How can I use trends and forecasting data in my district?

SMALL GROUP RESPONSES

Group A

UNIT:

1. Occupational data to assess district needs

   Compare current training to future market trends

DISTRICT:

1. Sharing of resources interdistrict will become more cost effective
2. Quality assurance
3. Develop of human resources
4. Determine state and national needs for employment

Group B

UNIT & DISTRICT:

1. Divisional goal setting/strategic planning
2. Supporting evidence for planning and budgeting
3. Identify target populations not presently served
4. Career counseling
5. Program evaluations
6. Curriculum development and change/modification
7. Advisory committee discussion/validation
8. Personnel additional, equipment, facilities

Group C

UNIT:

- o Select new programs for development
- o Make decisions about program reduction
- o Determine which program ideas are not feasible
- o Modify and update programs
- o Marketing programs
- o Identify potential training for business and industry
- o Use trends and forecasting information to provide technical assistance to business and industry

DISTRICT:

- o Set broad strategic goals
- o Communicate and gain support for unit objectives
- o Identify district wide student services needs
- o Position district in educational marketplace
- o Plan professional development for staff and faculty